

REMARKS

By this Amendment, claims 1-13 are amended. Thus, claims 1-13 are active in the application. Reexamination and reconsideration of the application are respectfully requested.

The specification and abstract have been carefully reviewed and revised in order to correct grammatical and idiomatic errors in order to aid the Examiner in further consideration of the application. The amendments to the specification and abstract are incorporated in the attached substitute specification and abstract. No new matter has been added.

Also attached hereto is a marked-up version of the substitute specification and abstract illustrating the changes made to the original specification and abstract.

The Applicants thank the Examiner for acknowledging the Applicants' claim of foreign priority based on Japanese Patent Application No. 2000-289069, filed on September 22, 2000. The Examiner indicated, however, that a certified copy of the foreign priority document has not been filed. Accordingly, a certified copy of the foreign priority document is submitted concurrently herewith under a separate cover letter. The Applicants respectfully request the Examiner to acknowledge receipt of the certified copy of the foreign priority document.

In item 2 on page 2 of the Office Action, Figures 11-13 were required to be labeled as "Prior Art." Replacement formal drawings of Figures 1-13 are submitted concurrently herewith under a separate cover letter in order to label Figures 11-13 as "Prior Art" and to correctly spell the term "Receiver" (52) in Figure 10. Approval of the replacement formal drawings is respectfully requested.

The Applicants thank the Examiner for kindly indicating, in item 5 on page 7 of the Office Action, that claim 13 would be allowable if rewritten in independent form to include the limitations of the base claim and any intervening claim.

Claim 13 has been rewritten in independent form to include the limitations originally presented in claims 3 and 10.

Accordingly, in view of the Examiner's assertion that claim 13 would be allowable if rewritten in independent form to include the limitations of the base claim and

any intervening claim, the Applicants respectfully submit that amended claim 13 is clearly in condition for allowance.

In item 3 on page 3 of the Office Action, claims 1-3, 6 and 9-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura (U.S. 5,974,040). This rejection is respectfully traversed for the following reasons.

The present invention provides a demodulation method, a modem and a traffic system including at least one base station for establishing synchronization from a received signal that contains a synchronization establishment whose change in amplitude periodically alternates between positive and negative, and for demodulating the received signal. The present invention also provides a synchronization establishment apparatus which is operable to establish synchronization from a received signal that contains a preamble pattern whose change in amplitude periodically alternates between positive and negative.

In particular, according to the present invention, synchronization is established based on the timing of changes in the positive/negative polarity of the change in the amplitude of the synchronization establishment signal. In the case of the synchronization establishment apparatus described above, synchronization is established based on the timing of changes in the positive/negative polarity of the change in amplitude of the preamble pattern. Because the present invention detects the timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal (or the change in amplitude of the preamble pattern), even when an average value of these signals is increased due to the addition of noise, the present invention can accurately and reliably detect the correct timing.

Furthermore, in the present invention, synchronization is established based on a plurality of timings (for example, average timing) of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal (or the change in amplitude of the preamble pattern).

Claim 1 recites the demodulation method of the present invention for establishing synchronization from a received signal that contains a synchronization establishment signal whose change in amplitude periodically alternates between positive and negative. The demodulation method of claim 1 comprises, in part, establishing synchronization

from a plurality of timings of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal.

Claim 3 recites the synchronization establishment apparatus of the present invention which is operable to establish synchronization from a received signal that contains a preamble pattern whose change in amplitude periodically alternates between positive and negative. The synchronization establishment apparatus of claim 3 comprises positive/negative change timing detection means for detecting a plurality of timings of changes in the positive/negative polarity of the change in amplitude of the preamble pattern, and synchronization establishment means for establishing synchronization from the received signal based on the timings detected by the positive/negative change timing detection means.

Claim 4 recites the modem of the present invention which is operable to establish synchronization from a received signal that contains a synchronization establishment signal whose change in amplitude periodically alternates between positive and negative. The modem of claim 4 comprises, in part, positive/negative change timing detection means for detecting a plurality of timings of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal, and synchronization establishment means for establishing synchronization from the received signal based on the timings detected by the positive/negative change timing detection means.

Claim 5 recites the traffic information system of the present invention which comprises at least one base station operable to wirelessly communicate with mobile stations, to wirelessly receive a signal from the mobile stations that contains a synchronization establishment signal whose change in amplitude periodically alternates between positive and negative, and to establish synchronization from the received signal. The at least one base station of claim 5 comprises, in part, positive/negative change timing detection means for detecting a plurality of timings of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal, and synchronization establishment means for establishing synchronization from the received signal based on the timings detected by the positive/negative change timing detection means.

Kimura discloses a receiver and transmitter-receiver having a variable attenuator 3 which variably attenuates received modulated waves to avoid saturation caused by any of the received modulated waves. In particular, Kimura discloses that signals s1 which are received by an antenna 1 are amplified by a power amplifier 2. The gain s2 of the received signal s1 is then attenuated by the variable attenuator 3. The output s3 of the variable attenuator is then converted into an intermediate-frequency signal and amplified through a frequency conversion mixer (MIX) 4, a band pass filter (BPF) 6, a second MIX 7 and a second BPF 9. The output s9 of the second BPF 9 is fed into a limit (LIM) amplifier 10, and the output s10 of the LIM amplifier is fed into a detector 11. The detector 11 performs an envelope detection of the power of the received modulated wave (see Column 3, line 24 to Column 4, line 12 and Figures 1 and 4).

Kimura discloses that the output s11 of the detector 11, which is the power of the signal of the received modulated wave, is output to a comparator 12. The comparator 12 compares the output s11 of the detector 11 with a reference voltage V_{ref} so as to output a signal s12 indicating whether the output s11 of the detector 11 exceeds the reference voltage V_{ref} or a differential value therebetween. The reference voltage V_{ref} indicates a level at which no saturation of the output signal s2 of the power amplifier 2 is caused. A timing generation circuit 14 generates a timing signal T_m , and when the output signal s11 of the detector 11 or the differential output signal s12 of the comparator 12 is positive, a holding circuit holds the differential output signal s12 of the comparator and outputs a control signal s13 to the variable attenuator 3 so as to control the variable attenuator 3 to attenuate the output signal s2 of the power amplifier 2 to avoid saturation. In other words, when the output signal s10 of the LIM amplifier is detected by the detector 11 to rise above the zero point and does not exceed the reference voltage V_{ref} , no pulse is generated in the timing signal T_m . Accordingly, the holding circuit 13 is kept in a state of holding 0V which indicates that the amount of attenuation is 0dB. (see Column 3, lines 45-60, Column 4, lines 41-50, Column 5, lines 19-50).

However, Kimura clearly does not disclose or suggest detecting changes in the positive/negative polarity of the change in amplitude of the preamble pattern. Instead, the comparator 12 merely compares the output signal s11 of the detector and the reference voltage V_{ref} for controlling the variable attenuator, where each of the output

signal s11 of the detector 11 and the reference voltage V_{ref} is not a differential value of the amplitude of a signal. Furthermore, the output signal s11 of the detector 11 clearly is a constant positive or zero value (i.e., not a negative value) since the detector 11 effects envelope detection of the power of the output signal s10 of the LIM amplifier (see Figure 3B).

Accordingly, Kimura clearly does not disclose or suggest means for detecting changes in the positive/negative polarity of the change in amplitude of a synchronization establishment signal or a preamble pattern contained in the received signal, as recited in claims 3-5. As described above, because the claimed invention detects the timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal (or the change in amplitude of the preamble pattern), even when an average value of these signals is increased due to the addition of noise, the present invention can accurately and reliably detect the correct timing. However, when an average power of the output signal s11 of the detector 11 is increased due to noise, Kimura cannot detect the correct timings.

Moreover, as described above, synchronization is established in the claimed invention based on a plurality of timings of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal or the preamble pattern contained in the received signal. However, in contrast to the present invention, the synchronization timing T_m of Kimura is established based on only one timing, that is, the output signal s12 of the comparator 12.

Accordingly, Kimura clearly does not disclose or suggest establishing synchronization from a plurality of timings of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal, as recited in claim 1.

Similarly, Kimura clearly does not disclose or suggest positive/negative change timing detection means for detecting a plurality of timings of changes in the positive/negative polarity of the change in amplitude of the preamble pattern, as recited in claim 3. Further, Kimura also clearly does not disclose or suggest positive/negative change timing detection means for detecting a plurality of timings of changes in the

positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal, as recited in claims 4-5.

Moreover, Kimura also does not disclose or suggest synchronization establishment means for establishing synchronization from the received signal based on the timings detected by the positive/negative change timing detection means, as recited in claims 3-5.

Accordingly, Kimura clearly fails to disclose or suggest each and every limitation of claims 1 and 3-5. Therefore, claims 1 and 3-5 are clearly patentable over Kimura since Kimura fails to disclose or suggest each and every limitation of claims 1 and 3-5.

In item 4 on page 4 of the Office Action, claims 4-5, 7-8 and 11-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura in view of Ejzak et al. (U.S. 6,069,883).

As demonstrated above, Kimura clearly fails to disclose or suggest each and every limitation of claims 1 and 3-5. Similar to Kimura, Ejzak et al. also clearly fails to disclose or suggest establishing synchronization from a plurality of timings of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal, the positive/negative change timing detection means of claims 3-5, and the synchronization establishment means of claims 3-5.

Accordingly, Kimura and Ejzak et al., either individually or in combination, fail to disclose or suggest each and every limitation of claims 1 and 3-5. Therefore, no obvious combination of Kimura and Ejzak et al. would result in the inventions of claims 1 and 3-5 since Kimura and Ejzak et al., either individually or in combination, clearly fail to disclose or suggest each and every limitation of claims 1 and 3-5.

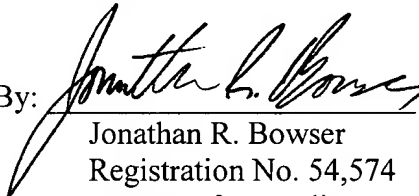
Furthermore, it is submitted that the clear distinctions discussed above are such that a person having ordinary skill in the art at the time the invention was made would not have been motivated to modify Kimura and Ejzak et al. in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 1 and 3-5. Therefore, it is submitted that the claims 1 and 3-5, as well as claims 2 and 6-12 which depend therefrom, are clearly allowable over the prior art as applied by the Examiner.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is respectfully solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

Manabu NAKAMURA et al.

By: 
Jonathan R. Bowser
Registration No. 54,574
Attorney for Applicants

JRB/ck
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
March 16, 2005

AMENDMENTS TO THE DRAWINGS

Replacement formal drawings of Figures 1-13 are submitted concurrently herewith under a separate cover letter.